

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A tracking error detection device for an optical disk apparatus using a modulation coding method in which a minimum value of a run-length is 1, the device comprising:

a detecting unit which includes at least two detectors and detects a reflected light from a series of pits formed on an optical disk;

a phase comparing unit which detects a phase difference of outputs of the at least two detectors; and

a low-pass filter which smoothes an output of the phase comparing unit, a cut-off frequency of the low-pass filter being higher than a frequency at which a spectrum of a modulation code recorded in the optical disk becomes -10 dB relative to a frequency component of a code before modulation and lower than a frequency at which the spectrum of the modulation code recorded in the optical disk becomes -5 dB.

Claim 2 (Original): A tracking error detection device according to claim 1, wherein the cut-off frequency of the low-pass filter is at least 8 times of a frequency band of tracking servo control of the optical disk apparatus.

Claim 3 (Canceled).

Claim 4 (Currently Amended): A tracking error detection device for an optical disk apparatus using a modulation coding method in which a minimum value of a run-length is 1, the device comprising:

a detecting unit which includes four detectors diagonally arranged relative to a center of a pit formed on an optical disk and detects a reflected light from a series of pits formed on the optical disk;

an adder which adds two outputs of two sets of two detectors diagonally arranged and outputting a first detection signal and a second detection signal;

an equalizer which equalizes a waveform of the first detection signal and the second detection signal in order to compensate high-frequency components of the first and second detection signals;

a binarizing unit which binarizes equalized first and second detection signals;

a phase difference detecting unit which detects a phase difference of binarized first and second detection signals; and

a low-pass filter which smoothes an output of the phase difference detecting unit, a cut-off frequency of the low-pass filter being higher than a frequency at which a spectrum of a modulation code recorded in the optical disk becomes -10 dB relative to a frequency component of a code before modulation and lower than a frequency at which a spectrum of the modulation code recorded in the optical disk becomes -5 dB.

Claim 5 (Original): A tracking error detection device according to claim 4, wherein the cut-off frequency of the low-pass filter is at least 8 times of a frequency band of tracking servo control of the optical disk apparatus.

Claim 6 (Currently Amended): A tracking error detection method for an optical disk apparatus using a modulation coding method in which a minimum value of a run-length is 1, the method comprising:

detecting a reflected light from a series of pits formed on an optical disk by using at least two detectors;

detecting a phase difference of outputs of the at least two detectors; and

smoothing the detected phase difference by using a low-pass filter of which cut-off frequency is higher than a frequency at which a spectrum of a modulation code recorded in the optical disk becomes -10 dB relative to a frequency component of a code before modulation and lower than a frequency at which the spectrum of the modulation code recorded in the optical disk becomes -5 dB.

Claim 7 (Original): A tracking error detection method according to claim 6, wherein the cut-off frequency of the low-pass filter is at least 8 times of a frequency band of tracking servo control of the optical disk apparatus.

Claim 8 (Canceled).

Claim 9 (Currently Amended): A tracking error detection method for an optical disk apparatus using a modulation coding method in which a minimum value of a run-length is 1, the method comprising:

detecting a reflected light from a series of pits formed on an optical disk unit by using four detectors which diagonally arranged relative to a center of a pit formed on the optical disk;

adding two outputs of two sets of two detectors diagonally arranged and outputting a first detection signal and a second detection signal;

equalizing a waveform of the first detection signal and the second detection signal in order to compensate high-frequency components of the first and second detection signals;

binarizing the equalized first and second detection signals;
detecting a phase difference of the binarized first and second detection signals; and
smoothing the detected phase difference by using a low-pass filter of which cut-off frequency is higher than a frequency at which a spectrum of a modulation code recorded in the optical disk becomes -10 dB relative to a frequency component of a code before modulation and lower than a frequency at which a spectrum of the modulation code recorded in the optical disk becomes -5 dB.

Claim 10 (Original): A tracking error detection method according to claim 9, wherein the cut-off frequency of the low-pass filter is at least 8 times of a frequency band of tracking servo control of the optical disk apparatus.